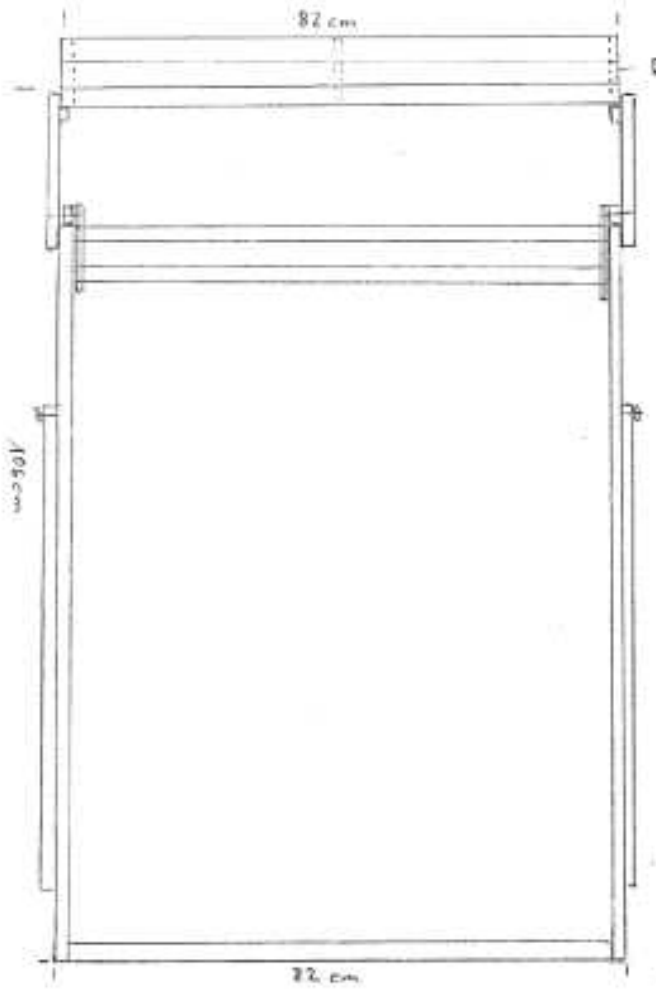
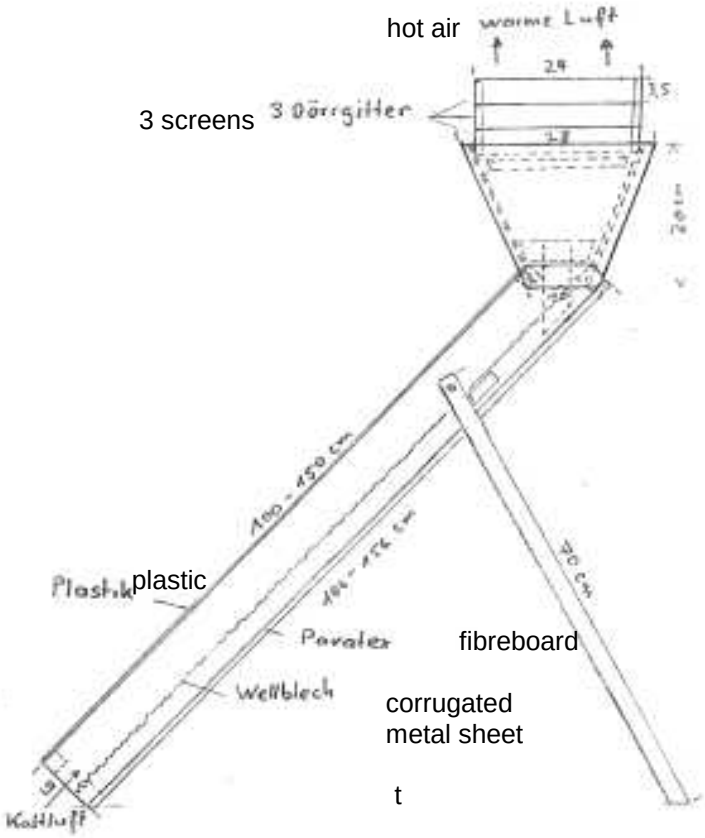
How to build a Solar Food Dryer

Material: Wooden boards and rods for the main frame and screen frame. Fibreboard (better than plywood) for the back side and drying top.Corrugated metal sheet and black dispersion paint. Glass or plastic cover. Screen or wire mesh (plastic material or rustproof metal). Nails (2cm), screws (5cm) and 2 thumb screws

Measurements: Measurements can be changed but proportions should be maintained. The larger the black absorbing surface, the larger the drying screens.



screen



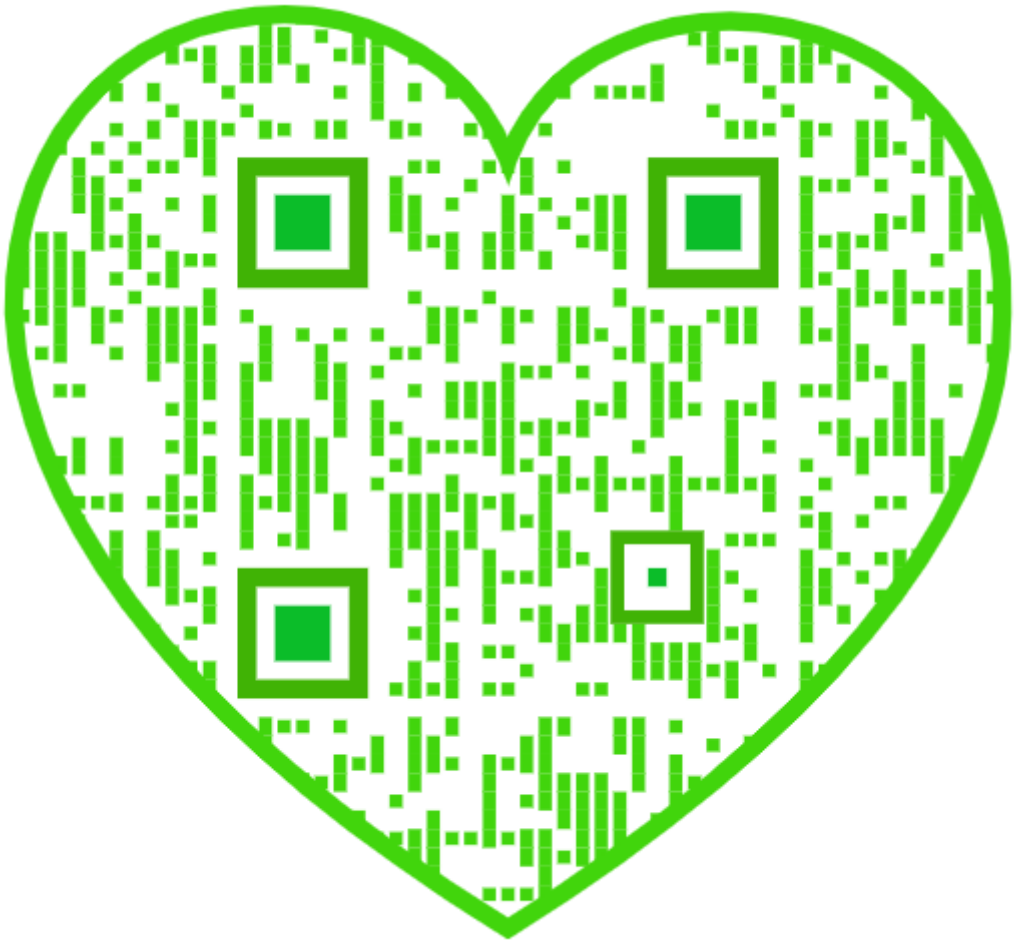
hot air

3 screens

plastic

fibreboard

corrugated metal sheet



Solar Food Dryer

Basic Principle

A solar food dryer consists of a flat box (frame) placed at an angle, with an open bottom and top, so that the air can circulate. Corrugated metal sheet, painted black, is placed on the bottom of the box. The black colour absorbs the sun rays and heats the air above. The frame is covered with glass, transparent plastic foil or a plain garden plastic. The warm air reaches 40 - 50°C, rises and leaves the heating box through the top opening and flows through the drying chamber with the drying screens. Cool environment air is sucked off through the bottom opening.
The dryer's angle must be adapted to the respective geographical latitude: In Europe steeper (60°), and in the tropics flatter (30°). With a flat angle, air circulation can be improved by adding a chimney. The solar dryer only works with direct solar radiation and works best during dry periods when there is little humidity in the air.

How to dry with solar energy

Why dry? To dry with warm and dry air is the easiest and cheapest conserving method. A solar dryer can considerably speed up this process. A solar cooker can also be used to dry food; to do so the cover must not be closed completely.
The warm air draws water from fresh food and thus conserves it without destroying vitamins and without affecting the nutrient content.

What can be dried?

The solar dryer is suitable for tomatoes, bananas, mangos, apples, plums, tea, fish etc.

How to dry?

Food to be dried is cut in halves or slices or shredded and placed on the screens. Fruit should not be too ripe and juicy to avoid dripping. Dry the tea leaves without very large stems.

Drying time

The length of time with any drying procedure depends on the water content of the food, the temperature and the humidity in the air. Tea leaves only need a few hours but tomatoes and fruit may take several days to dry. The interruption of the drying process at night is an advantage because fast drying produces crusts that obstruct a further withdrawal of water. Any crusts are therefore soaked during the night and the next day the drying process can go on unhindered.

Cover

Food should not be exposed directly to the sun because it changes its colour. Therefore, the top drying screen should be covered with an empty screen or a lid with holes, keeping off flies at the same time.

Position of the dryer

It is not necessary to direct the solar dryer in the course of the day to the changing position of the sun. It is good enough to place it according to the highest position of the sun at midday.

Durability

Dried food keeps for several years if stored in an airtight container (plastic bag or glass screwed tightly). Food kept in the open or in a container not closed tightly, will absorb the humidity in the air so that mould, putrefactive bacteria or insects can destroy the food.